

Keiichi SUGIYAMA* **The Laboulbeniomyces of eastern Asia (1) On two new species of *Laboulbenia* and one new species of *Rickia***

杉山恵一*: 東アジアのラブールベニア菌 (1) ラブールベニア属の
2 新種およびリッキア属の 1 新種について

Laboulbeniomyces Ainsworth, a class of the subdivision Ascomycotina Ainsworth, is widely distributed in the world and includes about 1800 species known at present. All the members of this fungus group are minute ectoparasites of arthropods, especially insects. The systematics of Laboulbeniomyces was established by Thaxter (1896, 1908, 1924, 1926 and 1931) through his voluminous monographic works. Subsequently, taxonomic and floristic researches on this fungus group have been done in various parts of the world by many authors, but only a few works concerning the Laboulbeniomyces of eastern Asia including Japan, Korea, China and Formosa (=Taiwan) have been published. Regarding the Laboulbeniomyces of Japan, 18 species and two varieties were reported in Thaxter's monograph (loc. cit.). Sugiyama (1973) published a revisional work on Japanese Laboulbeniomyces including 58 species and one variety known in this region at that time. Recently Terada (1977) added seven species of this fungus group to the Japanese flora. No report on Korean representatives has yet been made and only one report dealing with nine species was published by Terada (1976) as to Formosan ones.

Recently, I had a chance to examine the late Mr. Mitsuharu Ishikawa's collection of Laboulbeniomyces preserved in the National Science Museum, Tokyo. This includes a number of specimens collected at many places in Japan and Formosa as well as the mainland of China. Moreover, I visited Formosa in the summer of 1976 and 1977 and collected a number of specimens of Laboulbeniomyces including some unknown species. Dr. K. Kurosa, on the other hand, kindly offered me a considerable number of specimens of

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this fungus group collected in Japan, Formosa and other Asiatic regions.

The present paper is devoted to the descriptions of two new Formosan species of the genus *Laboulbenia*, and one new Japanese species of the genus *Rickia*. The holotypes of the new species are deposited in the herbarium of the National Science Museum, Tokyo.

Before going further, I wish to express my hearty thanks to Dr. Syo Kurokawa of the National Science Museum, Tokyo, for permission to examine Ishikawa's Laboulbeniomycetes collection and to Dr. Kazuyoshi Kurosa of the Institute of Medical Science, University of Tokyo, for helpful suggestions and identification of host insects. I am much indebted to many entomologists for identifying host insects. Among them, I wish to express my special thanks to Dr. Akinobu Habu (National Institute of Agricultural Science), Dr. Takehiko Nakane (National Science Museum, Tokyo), Mr. Yasuaki Watanabe (Tokyo University of Agriculture) and Mr. Yasutoshi Shibata (Nichidai-Sanko High School).

1. ***Laboulbenia formosana*** Sugiyama, sp. nov. (Fig. 1, A)

Ramus posterior receptaculi ex cellula basilare solitaria et 2-3 cellulis subbasilaribus et 2-4 ramulis simplicibus super cellulam subbasilarem constans. Ramus anterior ramo posteriori similis, super cellulam subbasilarem antheridio praeditus.

Thalli hyaline, partly suffused with brown to blackish brown. Receptacles composed of receptacles proper and 2 distal branches; receptacles proper cylindrical, 330-410 μm long, consisting of 5 layers of cells; layers one-celled except the fourth one; the first layer brownish, isodiametric, gently becoming thinner both to the basal and distal ends, 118-160 μm long, 45-52 μm thick; the second layer hyaline contrasting with the opaque first layer, isodiametric, supporting distally the third layer of the receptacle and the stalk of perithecium, 118-145 μm long, 42-65 μm thick; the third layer as dark as the first one, more or less longer than thick, united to the stalk of perithecium at lateral side through the whole length, 35-57 μm long, 30-45 μm thick; the fourth layer concolorous with the third layer, composed of two cells arranged antero-posteriorly, 30-50 μm long, 38-48 μm thick; the anterior cell short, subtriangular in lateral view, united to the distal half of the posterior cell on lateral side, 8-12 μm long, 25-28 μm thick; the fifth layer blackish, opaque, flat, band-shaped in lateral view; branches of

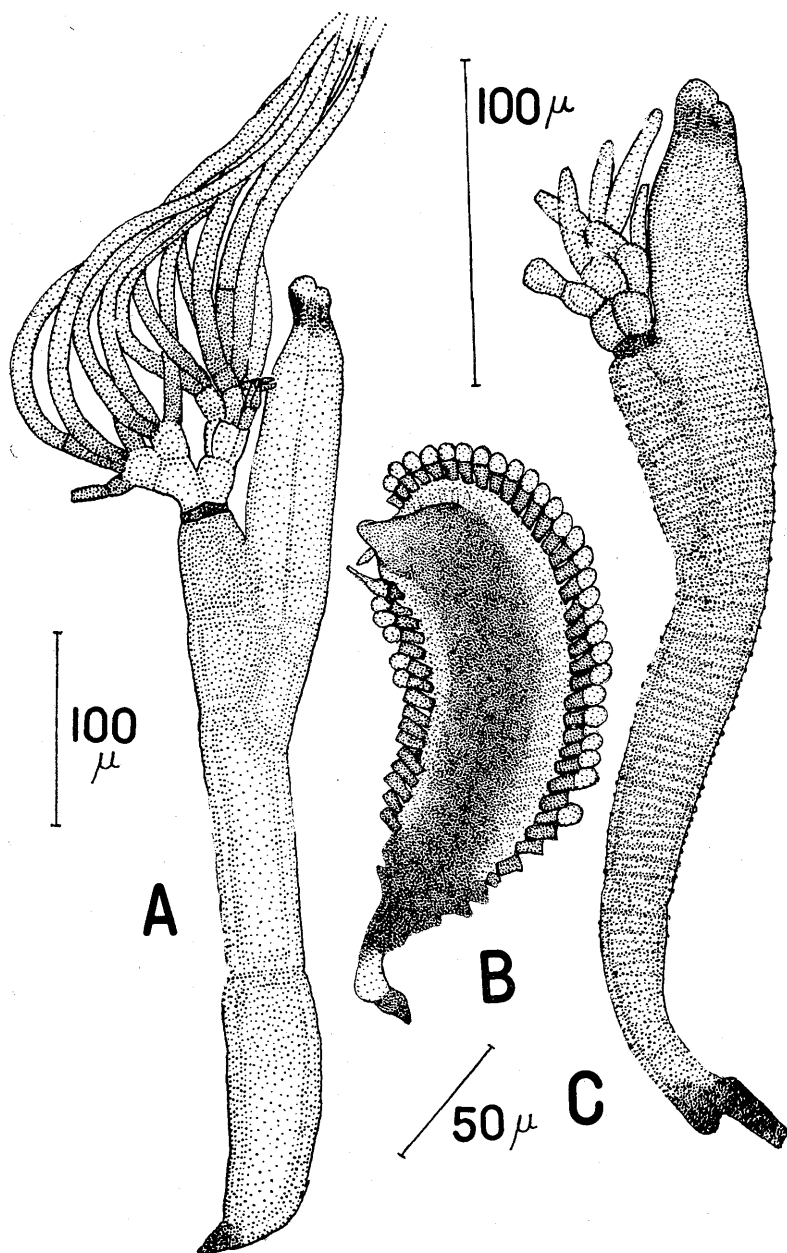


Fig. 1. A. *Laboulbenia formosana* Sugiyama. K-S-1963. B. *Rickia nigella* Sugiyama. K-S-1789 A.
C. *Laboulbenia striata* Sugiyama. M-I-713.

the receptacle formed on the fifth layer of the receptacle, arranged antero-posteriorly; the posterior branch composed of 1 hyaline basal and 2-3 hyaline subbasal cells and 2-4 dark simple branchlets on each subbasal cell, 30-50 μm long; the anterior branch similar to the posterior one. Perithecia composed of perithecia proper and stalks; perithecia proper hyaline, more or less leaning anteriorly, almost completely free from the receptacle, uniformly becoming thinner towards both basal and distal ends, more or less constricted and distinctly blackened at subbasal portion, rounded at the apex, 185-207 μm long, 68-75 μm thick; stalks of the perithecia concolorous with the perithecium proper, formed on the distal end of the second layer of the receptacle, united to the fourth layer of the receptacle on lateral side through the whole length, 40 μm long, 30 μm thick. Antheridia brownish, subcylindrical, formed on a short unicellular stalk on basal part of the anterior or rarely posterior branch of the receptacle in small clusters, 18-20 μm long, 5 μm thick.

Host species: *Lesticus chalcothorax* Chaudoir (det. Dr. A. Habu) (Coleoptera: Carabidae).

Distribution: Endemic to Formosa.

Specimens examined: Formosa (exact locality is unknown) K. Sugiyama 1963 (holotype) and 1904.

The present new species is somewhat similar to certain forms of the *L. flagellata* complex in gross morphology. The branches of the new species are quite different from those of *L. flagellata* and its allied species in having usually more than two simple branchlets on subbasal cells of both anterior and posterior branches of the receptacle. In the conformation of this organ, *L. formosana* resembles *L. agoni* Sugiyama. However, it is readily distinguished from the latter by the perithecium which is almost wholly free from the receptacle. In the genus *Laboulbenia* the lateral side of the receptacle on which perithecial stalk is formed, is tentatively considered as the anterior side of the receptacle.

2. ***Laboulbenia striata*** Sugiyama, sp. nov. (Fig. 1, C)

Laboulbenia striatella Ishikawa, Collecting and Breeding 10: 304. 1948. nom. nud.

Receptaculum stratos numerosos transversales ex eminentiis minutis superficialibus constantes habentis.

Thalli hyaline, olivaceous, 315-335 μm long. Receptacles composed of

receptacles proper and two distal branches arranged antero-posteriorly, 320-330 μm long; receptacles proper cylindrical consisting of five layers of cells, having many transverse stripes consisting of numerous fine prominences arranged along the whole circuit of cells; the stripes distributed through almost whole length of the receptacles proper; the layers of the receptacles proper one-celled except for the fourth ones; the first layer thickest at the distal end, uniformly becoming thinner towards the basal end, often curved posteriorly, having the similar surface stripes to those of the receptacle on the distal half portion, 80-95 μm long, 24 μm thick, forming basally a blackish cuneiform foot; the second layer thickest at the distal end, gradually becoming thinner towards the distal end of the first layer, having the surface stripes through the whole length, supporting distally the third layer of the receptacle and a stalk of the perithecium, 108-113 μm long, 30 μm thick; the remaining layers forming the distal portion of the receptacle proper, united to the cells of perithecium proper or perithecial stalk on lateral side, having the surface stripes; the third layer 35-40 μm long, 20 μm thick; the fourth layer composed of two cells arranged antero-posteriorly, 30-33 μm long 25-27 μm thick; the anterior cell smaller, placed at the distal portion of the posterior one; the fifth layer distinctly blackish, flat, band-shaped in the lateral view, 5 μm long, 15-18 μm thick; branches of the receptacle hyaline, filamentous, seldom exceeding the top of the perithecium, 70-75 μm long; both the anterior and posterior branches dichotomous; the basal cell of the posterior branch inflated laterally. Perithecia concolorous with the receptacles, consisting of perithecia proper and stalks; stalk formed on the distal end of the second layer of the receptacle proper and united to the third layer on lateral side, having the surface stripes, 20-40 μm long, 18-22 μm thick; perithecium proper cylindrical, more or less becoming thinner towards both basal and distal ends, united to the fourth layer of the receptacle proper at the basal half on lateral side, having basally the surface stripes, blackened at subapical portion, 108-113 μm long, 33-34 μm thick; the posterior lip-cell longer than the anterior, rounded at the apex. Antheridium not observed.

Host species: *Agonum* sp. (Coleoptera: Carabidae).

Distribution: Endemic to Formosa.

Specimens examined: Formosa (exact locality is unknown; host insects

were collected by Y. Yano), April 27, 1941, M. Ishikawa 713 (holotype) and 714.

The presence of hyaline transverse stripes on the surface of the receptacle proper, of perithecia proper and of perithecial stalk are the main characteristics of this species. *L. verrucosa* Thaxter has also similar transverse stripes, but the prominences composing the stripes are far coarser in this species. The figures of *L. striata* was published by Ishikawa (1948) under the name *L. striatella* but without description.

3. ***Rickia nigella*** Sugiyama, sp. nov. (Fig. 1, B)

Thalli laminares; receptaculum triserialis; series media receptaculi pernigra; perithecium pernigrum; antheridium solitarium infla perithecium formatum.

Thalli leaf-like, hyaline, partly blackish and quite opaque, composed of receptacles, perithecia antheridia and appendages. Receptacles consisting of basal and distal portions, 190-210 μm long, 50-55 μm thick; basal portion composed of two layers of cells; the first layer hyaline, cylindrical, unicellular, forming a foot at the basal end; the second layer consisting of two blackish cells arranged antero-posteriorly; distal portion of the receptacle comprising three longitudinal series of cells; the anterior series composed of 19-20 hyaline cells, distal 3-5 cells united to the perithecia on lateral side; the median series blackish and quite opaque, terminating with a perithecium; the posterior series consisting of 37-38 hyaline cells; distal 5-7 cells united to the perithecium on lateral side. Perithecia almost wholly blackish, opaque, sub-ovate, united to the cells of both the anterior and median series of the receptacle except the apical small portion, 35-40 μm long, 15-22.5 μm thick; apex subconical, terminally hyaline. Antheridia hyaline, cylindrical, more or less becoming thinner towards the apex, formed near the distal end of the anterior series of the receptacle, 17.5 μm long, 5.0 μm thick. Appendages formed on both the anterior and posterior sides of the receptacles in longitudinal series, composed of basal and distal portions, 10-15 μm long, 5.0 μm thick; basal portion cylindrical, blackish, opaque; distal portion hyaline, bulb-shaped.

Host: An undetermined mesostigmatid mites associated with *Salganea* sp. (Blattaria: Panestidae) (the host insects were collected by Mr. Jun Okuma).

Distribution: Endemic to Japan.

Specimens examined: Uken-mura, Amami-Oshima Isl., Kagoshima Pref., Japan; April 26, 1976, K. Sugiyama 1789 A (holotype), 1789 B, C, D, E, F, G, H, I and J, 1790 B and C.

The hyaline cells of both the anterior and posterior series of the receptacle make a striking contrast to the blackish, completely opaque cells of the median series of the receptacle. This species is also unique in forming a solitary compound antheridium on the terminal portion of the anterior series of the receptacle. In the genus *Rickia*, the lateral side of the perithecium on which the distal cells of one (in biseriate species) or two (in triseriate species) longitudinal series of the receptacle are placed, is tentatively considered as the posterior side of the perithecium and the antero-posteriority of the thallus is to coincide with that of the perithecium.

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ラブールベニア菌綱 (子のう菌亜門) は節足動物、とくに昆虫類の微小な外部寄生菌として知られ、約 1800 種が世界から報告されている。我が国からは 69 種が報告されている。筆者は日本、台湾の各地に採集を行ない、相当な数にのぼる新種および新産種を得た。また、故石川光春氏は 1920 年代より本菌の採集を行い、日本、台湾、中国大陆などから多数の標本を得た。これらの標本および、アジア各地で昆虫学者によって採集

された昆虫から筆者が発見した本菌標本にもとづき 東アジア産ラブールベニア 菌の記載を行いたい。本論文はその第1部として、ラブールベニア属の2新種 *Laboulbenia formosana*, *L. striata* と、リッキア属の1新種 *Rickia nigella* の記載を行った。

(1) *Laboulbenia formosana* は *Lesticus chalthorax* Chaudoir (ゴミムシ科) の寄生菌で、台湾のみから知られている。外形は *L. flagellata* Peyr. に似るが、托の内外枝ともに第2基部細胞の上で通常3本以上の小枝に分れることで区別できる。

(2) *Laboulbenia striata* は托および被子器基部の表面に微小突起の集合からなる多くの横縞があることで特徴づけられる。台湾産の *Agonum* sp. (ゴミムシ科) から採集された。

(3) *Rickia nigella* はうちわ形をした小型の菌で、托の中央の黒色不透明な部分とその両側の透明な部分とが鮮かな対照をなしている。托の両側面にほとんどすき間もなく附属体が並んでいること、造精器がふつうたゞ1個しかないことなどが主な特徴である。奄美大島採集の *Salganea* sp. (オオゴキブリ科) に寄生する中気門類のダニから発見された。

□広瀬弘幸・山岸高旺(編) 日本淡水藻図鑑 Hirose, H. & T. Yamagishi (ed.) Illustrations of the Japanese Freshwater Algae pls. 8 pp. 25+933, 内田老鶴圃新社, ¥ 36,000 (1977, X)。1964年に意図してから11人の著者が協力して作り上げたもので、日本としてはもちろんはじめてである。1975年終りまでに日本各地に自生すると報告された種はもちろん、それまでに報告されていなかったものでも、各著者の手元で確認されていたものも含めてであるから、目として38, 種として2308(但し珪藻類はとくに種が多いので別冊として出版される), 変種や品種をも加えてあるから邦産を網羅したものといえることができる。

それを原則として各国版を左ページに、それに対する学名、記載、産地、分布、検索表等を右ページに列挙して、対面でわかり易くすることに骨を折っている。図はあるがその対面に説明のないものは、わざわざそのページを明記して見易くしてあるなど、大変な操作であったと思う。しかも、ページの一部に空白ができたところには、ノートとして各属種に附随する問題や研究者の紹介などをかかげてあるなど苦心もしてあるし、巻末には淡水藻の採集と研究法、日本淡水藻の分類学的研究略史、文献、学名索引、和名索引を添えてある。何ととっても今日の日本における淡水藻類を集大成した功績は大きい。感謝にたえないところであると共にひろく一般にすすめたい。

(前川文夫)